ENGR 102 Course Outline as of Fall 2020

CATALOG INFORMATION

Dept and Nbr: ENGR 102 Title: ROBOTICS DESIGN PROJECT
Full Title: Robotics Design Project
Last Reviewed: 4/13/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	1.00	Lecture Scheduled	1.00	17.5	Lecture Scheduled	17.50
Minimum	1.00	Lab Scheduled	0	2	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	1.00		Contact Total	17.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 35.00 Total Student Learning Hours: 52.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
Students will work in small groups to design, construct, and test a small autonomous robot using the LEGO Mindstorm Robotics Kits. Students gain exposure to mechanical and electrical engineering, as well as computer programming in a team-oriented environment.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will work in small groups to design, construct, and test a small autonomous robot using the LEGO Mindstorm Robotics Kits. Students gain exposure to mechanical and electrical engineering, as well as computer programming in a team-oriented environment. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended:

Limits on Enrollment:
Transfer Credit:
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	Effective:	Inactive:

CID:

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Demonstrate individual and team skills on a narrowly defined engineering task under time and competition pressures.
2. Design, build, program, test, and troubleshoot a LEGO Mindstorm autonomous robot.

Objectives:
At the conclusion of this course, the student should be able to:
1. Describe and apply appropriate team behaviors and time management skills.
2. Interpret and augment design specifications to develop detailed design goals.
3. Assemble LEGO components into functional autonomous robot.
4. Program LEGO controller modules to perform rudimentary tasks.

Topics and Scope:

I. Overview of Team Project Skills
   A. Team roles and behaviors
   B. Team time management
   C. Engineering design algorithms
   D. Oral presentation skills
II. Design Specifications
   A. Interpretation of design specifications
   B. Clarification and modification of design specifications
   C. Using design specifications to generate team goals
   D. Measurement techniques for design specification verification
III. LEGO Robotics Components
   A. Structural members and their assembly options
   B. Sensors and their measuring capabilities
   C. Motors and the corresponding torque/power characteristics

D. Battery pack options and their behaviors
E. Logic controller module (RCX or NXT)

IV. Module Programming
A. Direct programming with RCX and/or NXT code
B. Downloading to controller module
C. Indirect programming with C++ and associated compiler
D. Inputting from light and touch sensors
E. Outputting to motors and speaker

Assignment:

1. Participation, orientation, and teamwork exercises (2-5)
2. Self-paced assembly and programming training modules (1-2)
3. Preliminary technology demonstration
4. Project planning documents (typically detailed design goals and a tabular timeline with responsibilities)
5. Checkpoint meeting presentations and documents (typically three: concept, mechanical and software)
6. Self and team assessments (2-4)
7. Construction of robot
8. Robotic performance contest

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Project planning, checkpoint documents, and assessment reports	Problem solving 20 - 40%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Technology skill demonstrations, checkpoint meeting presentations, robot construction, robotics contest	Skill Demonstrations 30 - 50%

Exams: All forms of formal testing, other than skill performance exams.

None	Exams 0 - 0%

Other: Includes any assessment tools that do not logically fit into the above categories.

Participation in class exercises and design team activities. Completion of training modules.	Other Category 20 - 40%

Representative Textbooks and Materials:
Instructor prepared materials